INDIANA ROADSIDE OBSERVATION SURVEY OF SAFETY BELT USE AND MOTORCYCLE HELMET USE

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1.0 Executive Summary

This report provides an overview of the September 2001 Indiana roadside observation survey of safety belt use and motorcycle helmet use for the state of Indiana. The survey design, data entry, and analysis were performed by Purdue University's Center for the Advancement of Transportation Safety (CATS). Data collection was provided by several individuals, identified by the Governor's Council on Impaired and Dangerous Driving, and trained in observational techniques by a CATS staff member. The Governor's Council on Impaired & Dangerous Driving, Indiana Criminal Justice Institute provided funding for the project using funds received from the National Highway Traffic Safety Administration (NHTSA).

1.1 September 2001 Results

The seatbelt usage rate for all passenger vehicles rose by 5.3%.

The seatbelt usage rate for pickup trucks was 41.9%, continuing to be much lower than other passenger vehicles.

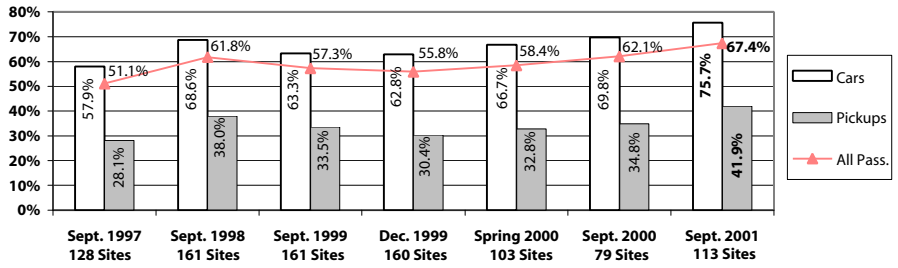
Female drivers continued to demonstrate higher usage rates (79.0 percent) than male drivers (61.9%).

The findings for the September 2001 survey indicate that the weighted usage rate for outboard front-seat occupants of all passenger vehicles increased from 62.1 percent in September 2000, to 67.4 percent during September 2001. This "all passenger vehicle" usage rate established a new high for Indiana, exceeding the 62.1 percent usage rate recorded in the September 2000 observational survey. The passenger car usage rate (75.7 percent) also exceeded the previous high 2000 rate of 69.8 percent. Similarly, high usage rates were seen for both minivans (79.5 percent) and sport utility vehicles (SUVs) (74.1 percent). Although pickup trucks continue to be exempt from the Indiana Occupant Protection Law, seat belt usage rates in these vehicles increased 7.1 percent to 41.9 percent in this most recent survey. Unfortunately, the continued low usage rate of seat belts by pickup truck occupants negatively affects the overall usage rate, as pickup trucks represented approximately 18.2 percent of the observed vehicles. An increase in usage rates by pickup truck occupants to 60 percent would have the impact of increasing the overall usage rate in Indiana by nearly an additional 4 percent.

Seat belt usage rates increased on all road classes in both rural and urban areas. Urban freeways had the highest usage rate of any roadway classification (84.3 percent for passenger cars). The lowest usage rate was 37.7 percent for pickup trucks on rural collector roads. For passenger cars, the largest gains were achieved on local and collector roads. The seat belt usage rates on all road classes for both rural and urban environments was greater than 70 percent for occupants of passenger cars.

Female drivers continued to demonstrate higher usage rates (79.0 percent) than male drivers (61.9 percent). Young male drivers of pickup trucks continued to post the lowest numbers for restraint use at 29.9 percent. Their seat belt usage rate was nearly half that seen by similar drivers when observed in passenger cars (57.8 percent).

Figure 1: Safety Belt Usage September 1997–September 2001



2.0 Survey Design

2.1 Introduction and History

The September 2001 Indiana Roadside Observation Survey of Safety Belt Use was the twenty-seventh in a series of surveys originally designed in 1985. The first through seventeenth surveys (1986 through 1993) were all conducted using a common protocol. In 1994, the survey was redesigned in conformance with guidelines published in the *Federal Register* [vol. 57, no. 125, June 2, 1992: 2889928904] by the National Highway Traffic Safety Administration. The revised design was discussed in the 1994 report (see also the 1998 report). For 1994 and earlier surveys, reporting of occupant restraint use was confined to passenger cars. In 1995, the survey was modified to permit reporting for a wider variety of vehicle types, including minivans, sport utility vehicles, and pickup trucks. Large passenger vans were included for the first time in the 1998 survey, as required by new NHTSA regulations. All vehicles identified as commercial have been excluded in each of the surveys through the 2000 survey. For the first time, the 2001 survey included commercial vehicles, with the exception of semi-tractor trailers and other large trucks with a gross vehicle weight greater than 10,000 lbs. that continue to be excluded from the survey.

A review of the 1994 survey design was conducted prior to the 1998 survey for all states through the NHTSA regional offices. The functional roadway classification for each of the 128 sites used in 1997 was verified using the Indiana Department of Transportation (INDOT) county and city functional classification maps. It was found that only 9 of 28 sites classified as a local road in the 1997 survey analysis were actually a local road in the INDOT database. There were, in fact, 54 arterial sites as compared to the 42 sites considered to be arterial in the 1997 analysis. To correct for this, 16 replacement sites and 33 additional new sites were selected. The 1998 review of the 1994 design also revealed that two of the counties (LaPorte and Porter) selected to represent high vehicle miles traveled (VMT) would not qualify for selection if the most recent VMT numbers were used (at that time-1997). Since the usage rates were expected to be most variable for local road sites, and the traffic volume much lower than for arterial and collector roadways, a high percentage of these new sites were classified as local roadways. The 1998 survey included 20 local rural sites and 20 local urban sites.

The spring 2000, 103-site survey used a proportional, random sample of the sites used for the 1998 and 1999 survey. The 1994 survey design called for eight roadway classes (four urban and four rural) and a classification of counties into three strata based on total VMT by county. Thus, there were three strata by eight roadway classes, or 24 cells in the sample design. The number of sites representing each cell varied, and since the percentages of VMT accounted for by a roadway class within each stratum were unequal, a single site represented three of the cells in the sample design. It was decided to retain these three sites in the survey and randomly select 100 of the other 158 sites to maintain the same proportions of sites in each of the other 21 cells. The desired number of sites for each cell was computed to maintain the same proportions as in the 1999 survey. A random number table was then used to select 100 sites from the 158. Once the desired number of sites for a cell had been chosen, additional choices that would belong to that cell were not accepted for the sample. While there was no requirement that all of the 24 counties represented in the 1994 survey design be included, at least one site from each of the counties was retained in the survey. The spring 2000 survey was conducted to validate the changes, prior to the State survey being conducted in the fall of 2000.

Since NHTSA permits states to exclude low population counties that comprise no more than 15 percent of the state's total population from their seat belt observational surveys, it was decided to examine the degree to which Indiana's weighted usage rates would be affected if exclusion of low population counties was exercised. The most recent US Census Bureau estimates for Indiana county populations were used to rank-order Indiana counties by population to determine the cumulative percents of total population. Eight of the surveyed counties (Perry, Fountain, Tipton, Newton, Decatur, Ripley, Daviess, and Franklin) fell into the lowest population counties that could be excluded. This reduced the total number of sites by 24 to 79 sites. Appropriate VMT weights were calculated for exclusion of the eight low-population counties.

NHTSA approved the redesigned survey for reporting Indiana's Year 2000 usage rates that employed these 79 sites and grouped the 16 represented counties into two groups (eight rural and eight urban). NHTSA likewise approved combining the local and collector roads by rural/urban locale into one rural category and one urban category. All of the September 2000 weighted rates reported here use this survey design.

2.2 September 2001 Survey Design

Prior to the September 2001 survey, a thorough analysis of the current survey design was conducted. As a result, it was recommended that the number of sites be increased in selected areas. Areas identified for the increase fell into two general categories. First, the larger cities' and counties' sites were increased to better represent their population impact on the entire state survey. Secondly, road classifications that historically represent a wider range of variation for seat belt usage rates in the observational results were also increased. These modifications were submitted to NHTSA for their review and subsequent acceptance. The approved survey modifications

increased the number of sites from 79 to 113, while continuing to exclude the lowest 15 percent population counties from the survey design.

The 113 sites were clustered into logical day trips. Each cluster was then assigned a randomly generated start time and day of the week. Data were collected on all days of the week. The collection day and time used in 1998 through 2000 for existing sites were retained whenever feasible. When scheduling constraints dictated a change in time or day, the proportion of sites assigned to weekend days, morning rush, evening rush, and midday time periods were maintained. Observation sessions were evenly distributed during daylight hours (the time period between 6:30 a.m. and 6:30 p.m.). For the September 2001 survey, traffic was observed for exactly 45 minutes at each of the sites (the same observation protocol used in September 2000). Seat belt use was recorded for front-seat outboard occupants only (driver and right front passenger, if present). The formulas used to estimate usage rates, standard deviations, and relative precision for the September 2001 survey can be found in the 1998 report.

For the first time, observed commercial vehicles (minivans, large vans, pickup trucks, and light trucks) were included in the September 2001 data collection process.

Collection of in-transit motorcycle data was discontinued with the 2001 survey, thus reducing the total amount of helmet data collected. This decision was based on the inability of the observers (given the number of different observers) to accurately identify the road class.

For the first time, observed commercial vehicles were included in the September 2001 data collection process. These vehicles principally included minivans, large vans, pickup trucks, and light trucks. Semi tractor-trailers and large trucks (gross weight greater than 10,000 lbs.) continued to be excluded from the survey.

Local Community Coordinators who were trained in data collection techniques by CATS personnel collected observational data. Observational site survey forms and summary site sheets were also developed and provided to the observers by CATS.

The following counties (number of sites) were represented in the September 2001 survey.

Allen (9)	Clark (4)	Clinton (2)	DeKalb (2)
Elkhart (7)	Gibson (4)	Hamilton (6)	Hancock (5)
Hendricks (5)	Henry (3)	Howard (5)	Jackson (6)
Lake (10)	LaPorte (8)	Marion (8)	Marshall (4)
Morgan (1)	Porter (7)	Tippecanoe (6)	St. Joseph (3)
Vanderburgh (8)			

3.0 Survey Results

Survey data was collected between September 9 and September 23, 2001. Usage rates were calculated based upon the front seat outboard occupants' use of the shoulder harness. For each of the eligible occupants, a determination was made as to whether the occupant was properly wearing the

shoulder harness (yes), whether s/he was improperly restrained (shoulder harness behind his/her back) or unrestrained (no), or whether it was impossible to determine if the occupant was properly using a restraint (unknown). All children located in the front passenger seat occupying a car or booster seat were excluded from the counts, due to the inability to accurately determine their restraint status.

For the September 2001 survey, a total of 14,856 vehicles were observed, including 14,856 drivers and 3,538 eligible front seat occupants.

For the September 2001 survey, a total of 14,856 vehicles were observed, including 14,856 drivers and 3,538 eligible front seat occupants, for a total of 18,394 total occupant observations. This compares with a total of 17,153 observations in the 2000 study, representing an increase of 7.2 percent in the number of observations. However, the 2001 survey consisted of 113 sites, while there were only 79 sites in 2000, which translates to a 43.0 percent increase in the number of sites. The reduced number of collected observations per site is presumably due to the inexperience of the observers, and the emphasis on data quality rather than quantity.

Table 1 summarizes restraint usage by vehicle type:

Table 1: September 2001 Seat Belt Usage Summary
113-Sites

Vehicle Type	Percent Restrained Weighted	Percent Restrained Non-Weighted	Relative Precision	95 Percent Confidence Interval
Cars	76.0 %	75.7 %	1.8%	76.0% +/- 2.7%
Pickups	41.9 %	41.9 %	2.7%	41.9% +/- 2.2%
All Passenger Vehicles	67.4 %	67.4 %	1.4%	67.4% +/- 1.8%

3.1 Restraint Usage by Roadway Class

Indiana roadways are classified by type of roadway. For the purposes of seat belt restraint calculations, roadways are classified as freeways (interstates), arterial, collector, and local roads. Population information also further refines the road classifications to either rural or urban areas. From the results of the September 2000 survey, the lowest percentage of restraint use was 25.0 percent for pickup truck occupants observed traveling on local/collector rural roads. The highest percentage (76.3 percent) of seat belt use observed was for occupants of passenger vehicles traveling on urban freeways. This resultant ratio of 3.04 (highest as compared to the lowest) was reduced in 2001 to 2.24. Likewise, the absolute difference in usage rates decreased from 51.3 percent in 2000 to 46.6 percent in the most recent survey. While the gap is somewhat less, the gap continues to be a large number. The 2001 survey's lowest use rates (37.7 percent) were observed on rural collector roads for occupants of pickup trucks, with the highest rates observed for occupants of passenger cars traveling on urban freeways (84.3 percent). Gains were made in all areas for both cars and pickup trucks. The greatest gains were achieved on local and collector roads in both rural and urban locales for occupants of

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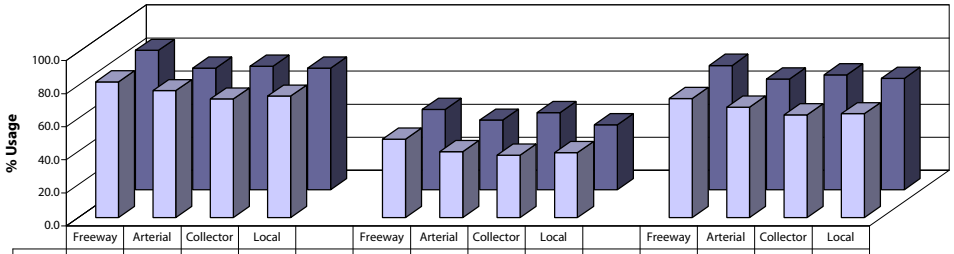
passenger cars. Unfortunately, only a minimal gain (2.1 percent) was achieved on freeways for occupants of pickup trucks. These nominal pickup truck gains indicate the limited effect of media end education programs on reaching and appealing to pickup truck occupants. Changing the primary law to include pickup trucks would probably have the greatest impact on increasing belt usage rates.

Figure 2: September 2001
Restraint Usage by Vehicle Type and Roadway Class
113-Site Survey



	Cars				Pickups				All Passenger Vehicles			
	Freeway	Arterial	Collector	Local	Freeway	Arterial	Collector	Local	Freeway	Arterial	Collector	Local
Rural	82.1	76.8	71.7	73.4	47.4	39.9	37.7	39.2	72	66.8	62.1	62.8
Urban	84.3	73.6	74.8	73.5	48.6	42.1	46.6	39.2	75.2	66.9	69.5	67.4

3.2 Restraint Usage by Vehicle Type

Minivans represented the highest overall usage rate for all occupants at 79.5 percent.

Pickup trucks and large vans in the 1998 through the 2000 surveys represented an increasing percentage of the observed vehicles (from 21.5 percent to 24.2 percent of the observed vehicles). The September 2001 survey saw that mix drop slightly to 22.4 percent of the observed vehicles. This group of vehicles represents nearly one out of four vehicles on Indiana roads, and yet, these vehicles are exempt from Indiana's primary law. Between the 2000 survey and the 2001 survey, there was an approximately 6 percent increase in restraint use among the typically higher restraint usage rate vehicles (cars, minivans, and SUVs). At the same time, an 8 percent increase was observed in the typically lower restraint usage rate vehicles (pickup trucks and large vans). The 6 percent gain in cars, minivans, and SUVs is considered to be a substantial improvement, given their already high usage rates. Minivans represented the highest overall usage rate for all occupants at 79.5 percent. While there has been much concern and discussion of seat belt usage laws relative to SUVs (the ability of occupants to claim exemption due to the vehicle being registered as a truck), this group of vehicles has an overall unweighted usage rate of 74.5 percent.

3.3 Restraint Usage by Gender and Role

Nearly two out of five male drivers continue to drive without using safety restraints.

The lowest usage rate persists among male passengers riding in pickup trucks (31.6%).

Historically, female drivers and female passengers are observed to have higher usage rates of seat belt restraint systems than their male counterparts. This pattern did not change in 2001. Overall, female drivers' use rate (unweighted) increased 10.0 percent to 79.0 percent, while the male driver usage rate (unweighted) increased 8.0 percent to 61.9 percent. Nearly two out of five male drivers continue to drive without using safety restraints. The highest usage rate (83.9 percent) was found to be female passengers of minivans, while the lowest usage rate persists among male passengers riding in pickup trucks (31.6 percent). Although this group of occupants still represents an extremely low compliance rate, for 2001, seat belt use among male passengers in pickup trucks achieved a 19.7 percent increase from the previous year's survey. For the first time, restraint usage rates for all passengers were nearly identical to the restraint usage rates for all drivers (68.8 percent versus 68.9 percent, respectively). Male front-seat passengers showed the largest gain, increasing to 56.5 percent from 43.8 percent in September 2000.

Table 2: Indiana September 2001 Unweighted Restraint Usage by Vehicle Type, Gender and Role

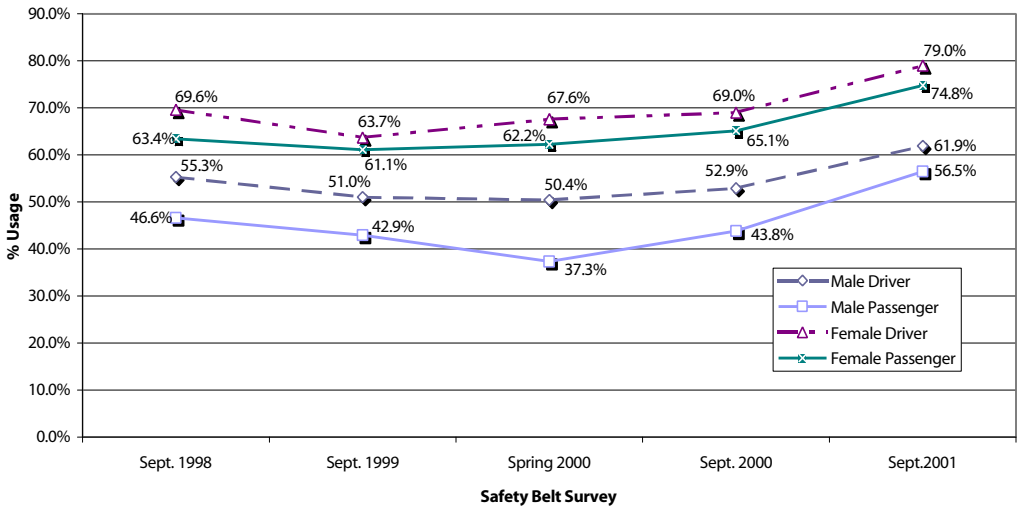
	All Drivers				Front-Seat Passengers				Eligible Occupants
Vehicle Type	R	NR	U	Percent Restrained	R	NR	U	Percent Restrained	Percent Restrained
Cars	6,201	1,922	155	76.3%	1,399	515	69	73.1%	75.7%
Pickup Trucks	1,194	1,673	112	41.6%	253	336	27	43.0%	41.9%
Minivans	1,133	295	44	79.3%	316	78	16	80.2%	79.5%
Large Vans	172	158	20	52.1%	53	28	9	65.4%	54.7%
SUV	1,267	450	60	73.8%	319	103	17	75.6%	74.1%
All Pass.	**9,967**	**4,498**	**391**	68.9%	**2,340**	**1,060**	**138**	68.8%	68.9%
	Female Drivers				**Female Front-Seat Passengers**				**Both**
Cars	3,129	779	87	80.1%	1,046	316	47	76.8%	79.2%
Pickup Trucks	182	128	3	58.7%	164	143	16	53.4%	56.1%
Minivans	661	138	21	82.7%	240	46	13	83.9%	83.0%
Large Vans	51	31	6	62.2%	37	13	5	74.0%	66.7%
SUV	649	163	23	79.9%	226	60	12	79.0%	79.7%
All Pass.	**4,672**	**1,239**	**140**	79.0%	**1,713**	**578**	**93**	74.8%	77.8%
	Male Drivers				**Male Front-Seat Passengers**				**Both**
Cars	3,072	1,143	68	72.9%	353	199	22	63.9%	71.8%
Pickup Trucks	1,012	1,545	109	39.6%	89	193	11	31.6%	38.8%
Minivans	472	157	23	75.0%	76	32	3	70.4%	74.4%
Large Vans	121	127	14	48.8%	16	15	4	51.6%	49.1%
SUV	618	287	37	68.3%	93	43	5	68.4%	68.3%
All Pass.	**5,295**	**3,259**	**251**	61.9%	**627**	**482**	**45**	56.5%	61.3%

Note: Drivers and passengers with unknown gender included in totals.

Legend: R= Restrained; NR=Not Restrained; U=Unknown Restraint; All Pass.=All non-commercial Passenger vehicles; SUV=Sport Utility Vehicles

Figure 3 shows the historical results since 1998 through the most recent survey for both gender and role (driver or passenger) of the occupant. While both genders have shown strong improvements in use rates, the male occupants continue to provide the greatest opportunity for improvement. With the approximate equal distribution between male and female occupants, each 1 percent improvement in the usage rate for males increases the overall usage rate by 0.5 percent.

Figure 3: Indiana Unweighted Restraint Usage by Gender and Role



3.4 Restraint Usage by Age of Driver and Passengers

When the young driver had no occupant, their usage rate was 61.7%, about 6% below the overall weighted average for the state.

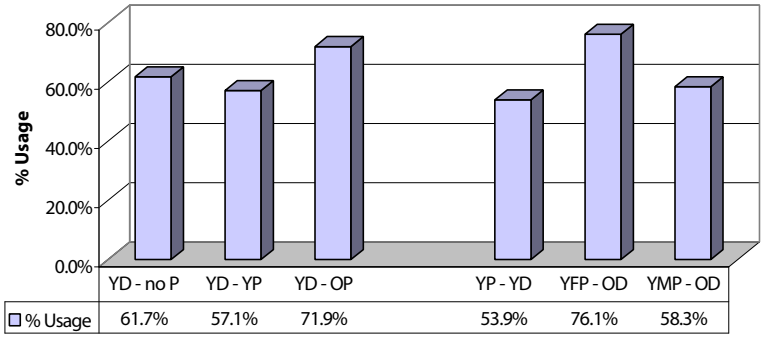
When a young passenger accompanied a young driver, the young driver's usage rate fell to 57.1 percent.

The September 2000 Indiana survey report was the first to compare seat belt use by the age of driver and the age of any front-seat, outboard passenger, if one was present. The determination that there is a young driver is a judgement decision based upon the field observer's best estimate. The cutoff age for a young driver is less than 21 years old. Figure 4 graphically displays the 2001 results. When the young driver had no occupant, their usage rate was 61.7 percent, about 6 percent below the overall weighted average for the state. However, when an older passenger (observer's estimate of 21 years old and over) accompanied a young driver, the usage rate of the young driver increased to 71.9 percent, above the overall weighted average for the state. When young passengers accompanied a young driver, the usage rates for the young passengers (53.9 percent) were in the same range as that of the young driver. When young passengers were observed riding with older drivers, seat belt use rates varied greatly depending upon the gender of the young passenger. For young female passengers riding with an older driver, those passengers had an observed usage rate of 76.1 percent, while the young male passengers had a usage rate of only 58.3 percent when being driven by an older driver. It would appear that older drivers are more tolerant or accepting of young male passengers (but not children) riding without the proper use of safety restraints.

For the young driver, seat belt use increased from 35.1 percent in 2000 to 57.1 percent in 2001.

When compared with the September 2000 results, all six of the combinations in figure 4 showed large increases for 2001. Particularly notable were the usage rates for both young passengers and young drivers when observed riding together. At that same time, the usage rate for young passengers increased from 33.1 percent in 2000 to 53.9 percent in 2001. What is particularly striking about the result is that this age group is particularly susceptible to significant peer pressure. Clearly, both young drivers and young passengers are influenced by the actions and perhaps, the influence of others in the vehicle as it relates to the proper usage of seat belts. Nonetheless, while the gains achieved this year are commendable, the usage rate for this group of occupants continues to be approximately 10 percent less than the overall state usage rate, leaving considerable room for continued focus and improvement.

Figure 4: Indiana Restraint Usage for Young Drivers and Passengers



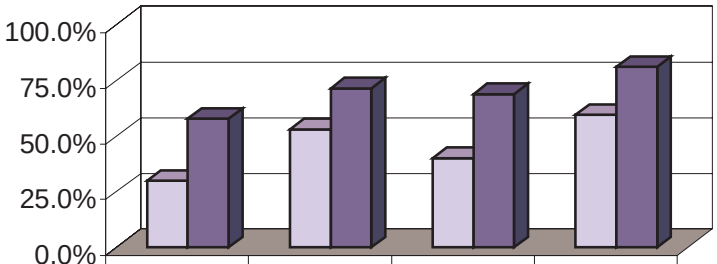
Legend

YD-no P: Young Driver - no **P**assenger
YD-YP: Young Driver - **Y**oung **P**assenger
YD-OP: Young Driver - **O**lder **P**assenger
YP-YD: Young Passenger - with **Y**oung **D**river
YFP-OD: Young Female Passenger - with **O**lder **D**river
YMP-OD: Young Male Passenger - with **O**lder **D**river

The young male driver of a pickup truck had a seat belt usage rate (29.9%) nearly half that of the same age driver observed in all other vehicles (57.8%).

The lower usage rates of the young and inexperienced drivers, coupled with the lack of a primary law on pickup trucks results in very low restraint usage rates when these drivers are observed. These usage rates have increased from half that level for young drivers operating pickup trucks (14.7 percent) versus all young drivers in other vehicles (38.0 percent) in the September 2000 survey. Figure 5 below displays the most recent September 2001 survey results comparing restraint use among pickup truck drivers and all other passenger vehicles by driver age and gender.

Figure 5: Usage Rates by Pickup Truck Drivers Compared to Drivers of All Other Vehicles

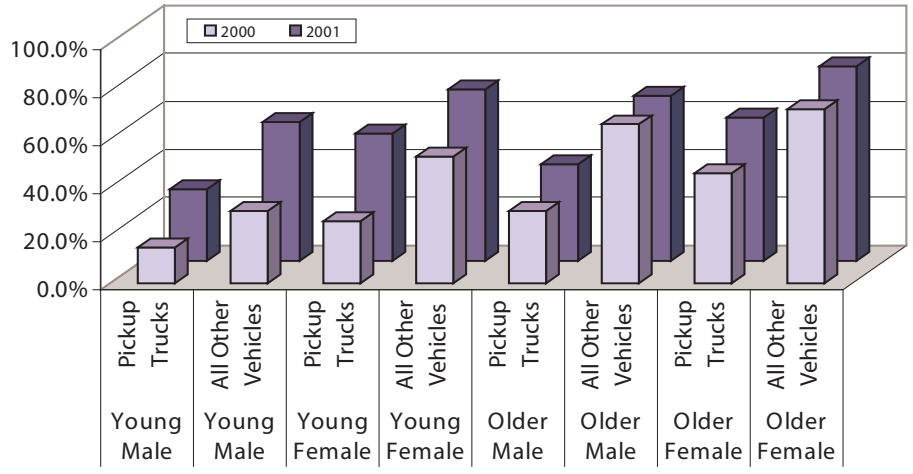


	Young	Young	Older Male	Older
Pickup Trucks	29.90%	53.10%	40.10%	59.60%
All Other Vehicles	57.80%	71.40%	68.80%	81.10%

A further comparison of the above results versus 2000 are shown in Figure 6:

Significant improvement in the use of seat belts was made among male drivers between 2000 and 2001. However, these drivers still lag behind the usage rates displayed by female drivers in both age groups and in all vehicles.

Figure 6: Usage Rates by Pickup Truck Drivers, Compared to Drivers of All Other Vehicles, 2000 versus 2001



3.5 Motorcycle Helmet Usage Rates

The overall helmet usage rate for 2001 was 32.8%.

The overall helmet usage rate for 2001 was 32.8 percent and corresponds to the 31.8 percent reported in 2000, and 37.6 percent reported in 1999. In the September 2001 survey, data was only collected during the assigned observation periods, not while in transit from one site to another. This change was made because of the difficulty in the observer accurately determining the correct road classification for those observations made on the transit roads. As a result, the total number of motorcycle observations was only 138 during this survey period.

4.0 Conclusions and Recommendations

Analysis of the September 2001 Indiana Observation Survey results showed positive improvements in all areas as defined by vehicle type, roadway type, gender, rural and urban locales, and for both driver and front seat occupants.

The experienced female driver and/or occupant, other than pickup truck occupants, have clearly heard and practice the message that seat belts save lives, as demonstrated by the seat belt usage rate of this grouping.

The opportunities to increase the usage of seat belts lie with the male occupants, particularly the inexperienced male driver, and virtually all drivers of pickup trucks.

While Indiana achieved an overall usage rate of 67.4 percent, this rate could have been increased with the following changes:

- Pickup trucks, estimated to account for nearly one out of five vehicles on Indiana's roads, with a combined male occupant usage rate of less than 40 percent, would increase the overall usage rate by an estimated:
  - 1 ½ percent with an increase in the male occupant pickup usage rate to 50 percent
  - 3 percent with an increase in the male occupant pickup usage rate to 60 percent
  - 5 percent with an increase in the male occupant pickup usage rate to 70 percent
- Young and inexperienced drivers and occupants have lower seat belt usage rates than older, more experienced drivers.

While there continues to be a gap between seat belt usage rates in rural versus urban locales, that gap has decreased. Likewise, the gap that has historically existed between local/collector roads and major roads such as arterial roads and interstates has also narrowed. This gap has now narrowed to less than a 10 percent difference. Due to their visibility and media attention, the use of enforcement zones is suspected to be a major contributor in that narrowing of that gap.

While sites are randomly selected to represent the entire state, weighted usage rates can only be accurately determined for the overall state. However,

Gibson County had the highest individual usage rate at 77.6 percent (4.7 percent of the total observations), followed by Allen and Marion counties, both reporting 74.6 percent. On the opposite end, Henry and Jackson counties, with usage rates of 52.1 percent and 53.4 percent, respectively, had the lowest usage rates.

Overall, the seat belt usage rates increased by 5.3 percent from the September 2000 survey, with passenger cars increasing by 5.9 percent (unweighted), and pickup trucks increasing by 6.3 percent (unweighted).

Emphasis within Indiana needs to continue to be on the passage of a primary law for pickup trucks. There is no valid reason to exclude pickup trucks from any seat belt requirements. (Note–the current Indiana law excludes pickup truck occupants from all seat belt usage requirements, including allowing unrestrained children (4+) to ride in the beds of pickup trucks or cargo areas of passenger vehicles, with the exception of requiring that a child under the age of four must be restrained in a pickup truck). Secondly, Indiana needs to pursue increased usage of seat belts by the younger age driving group. Without these changes, Indiana will continue to lag behind other primary law seat belt states.

5.0 References

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1.0 Executive Summary

This report provides an overview of the September 2001 Indiana roadside observation survey of safety belt use and motorcycle helmet use for the state of Indiana. The survey design, data entry, and analysis were performed by Purdue University's Center for the Advancement of Transportation Safety (CATS). Data collection was provided by several individuals, identified by the Governor's Council on Impaired and Dangerous Driving, and trained in observational techniques by a CATS staff member. The Governor's Council on Impaired & Dangerous Driving, Indiana Criminal Justice Institute provided funding for the project using funds received from the National Highway Traffic Safety Administration (NHTSA).

1.1 September 2001 Results

The seatbelt usage rate for all passenger vehicles rose by 5.3%.

The seatbelt usage rate for pickup trucks was 41.9%, continuing to be much lower than other passenger vehicles.

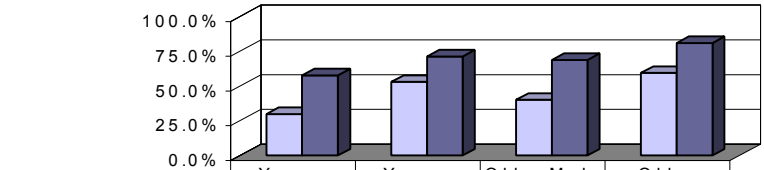
Female drivers continued to demonstrate higher usage rates (79.0 percent) than male drivers (61.9%).

The findings for the September 2001 survey indicate that the weighted usage rate for outboard front-seat occupants of all passenger vehicles increased from 62.1 percent in September 2000, to 67.4 percent during September 2001. This "all passenger vehicle" usage rate established a new high for Indiana, exceeding the 62.1 percent usage rate recorded in the September 2000 observational survey. The passenger car usage rate (75.7 percent) also exceeded the previous high 2000 rate of 69.8 percent. Similarly, high usage rates were seen for both minivans (79.5 percent) and sport utility vehicles (SUVs) (74.1 percent). Although pickup trucks continue to be exempt from the Indiana Occupant Protection Law, seat belt usage rates in these vehicles increased 7.1 percent to 41.9 percent in this most recent survey. Unfortunately, the continued low usage rate of seat belts by pickup truck occupants negatively affects the overall usage rate, as pickup trucks represented approximately 18.2 percent of the observed vehicles. An increase in usage rates by pickup truck occupants to 60 percent would have the impact of increasing the overall usage rate in Indiana by nearly an additional 4 percent.

Seat belt usage rates increased on all road classes in both rural and urban areas. Urban freeways had the highest usage rate of any roadway classification (84.3 percent for passenger cars). The lowest usage rate was 37.7 percent for pickup trucks on rural collector roads. For passenger cars, the largest gains were achieved on local and collector roads. The seat belt usage rates on all road classes for both rural and urban environments was greater than 70 percent for occupants of passenger cars.

Female drivers continued to demonstrate higher usage rates (79.0 percent) than male drivers (61.9 percent). Young male drivers of pickup trucks continued to post the lowest numbers for restraint use at 29.9 percent. Their seat belt usage rate was nearly half that seen by similar drivers when observed in passenger cars (57.8 percent).

Figure 5: Usage Rates by Pickup Truck Drivers Compared to Drivers of All Other Vehicles



	Young	Young	Older Male	Older
Pickup Trucks	29.90%	53.10%	40.10%	59.60%
All Other Vehicles	57.80%	71.40%	68.80%	81.10%

2.0 Survey Design

2.1 Introduction and History

The September 2001 Indiana Roadside Observation Survey of Safety Belt Use was the twenty-seventh in a series of surveys originally designed in 1985. The first through seventeenth surveys (1986 through 1993) were all conducted using a common protocol. In 1994, the survey was redesigned in conformance with guidelines published in the *Federal Register* [vol. 57, no. 125, June 2, 1992: 2889928904] by the National Highway Traffic Safety Administration. The revised design was discussed in the 1994 report (see also the 1998 report). For 1994 and earlier surveys, reporting of occupant restraint use was confined to passenger cars. In 1995, the survey was modified to permit reporting for a wider variety of vehicle types, including minivans, sport utility vehicles, and pickup trucks. Large passenger vans were included for the first time in the 1998 survey, as required by new NHTSA regulations. All vehicles identified as commercial have been excluded in each of the surveys through the 2000 survey. For the first time, the 2001 survey included commercial vehicles, with the exception of semi-tractor trailers and other large trucks with a gross vehicle weight greater than 10,000 lbs. that continue to be excluded from the survey.

A review of the 1994 survey design was conducted prior to the 1998 survey for all states through the NHTSA regional offices. The functional roadway classification for each of the 128 sites used in 1997 was verified using the Indiana Department of Transportation (INDOT) county and city functional classification maps. It was found that only 9 of 28 sites classified as a local road in the 1997 survey analysis were actually a local road in the INDOT database. There were, in fact, 54 arterial sites as compared to the 42 sites considered to be arterial in the 1997 analysis. To correct for this, 16 replacement sites and 33 additional new sites were selected. The 1998 review of the 1994 design also revealed that two of the counties (LaPorte and Porter) selected to represent high vehicle miles traveled (VMT) would not qualify for selection if the most recent VMT numbers were used (at that time-1997). Since the usage rates were expected to be most variable for local road sites, and the traffic volume much lower than for arterial and collector roadways, a high percentage of these new sites were classified as local roadways. The 1998 survey included 20 local rural sites and 20 local urban sites.

The spring 2000, 103-site survey used a proportional, random sample of the sites used for the 1998 and 1999 survey. The 1994 survey design called for eight roadway classes (four urban and four rural) and a classification of counties into three strata based on total VMT by county. Thus, there were three strata by eight roadway classes, or 24 cells in the sample design. The number of sites representing each cell varied, and since the percentages of VMT accounted for by a roadway class within each stratum were unequal, a single site represented three of the cells in the sample design. It was decided to retain these three sites in the survey and randomly select 100 of the other 158 sites to maintain the same proportions of sites in each of the other 21 cells. The desired number of sites for each cell was computed to maintain the same proportions as in the 1999 survey. A random number table was then used to select 100 sites from the 158. Once the desired number of sites for a cell had been chosen, additional choices that would belong to that cell were not accepted for the sample. While there was no requirement that all of the 24 counties represented in the 1994 survey design be included, at least one site from each of the counties was retained in the survey. The spring 2000 survey was conducted to validate the changes, prior to the State survey being conducted in the fall of 2000.

Since NHTSA permits states to exclude low population counties that comprise no more than 15 percent of the state's total population from their seat belt observational surveys, it was decided to examine the degree to which Indiana's weighted usage rates would be affected if exclusion of low population counties was exercised. The most recent US Census Bureau estimates for Indiana county populations were used to rank-order Indiana counties by population to determine the cumulative percents of total population. Eight of the surveyed counties (Perry, Fountain, Tipton, Newton, Decatur, Ripley, Daviess, and Franklin) fell into the lowest population counties that could be excluded. This reduced the total number of sites by 24 to 79 sites. Appropriate VMT weights were calculated for exclusion of the eight low-population counties.

NHTSA approved the redesigned survey for reporting Indiana's Year 2000 usage rates that employed these 79 sites and grouped the 16 represented counties into two groups (eight rural and eight urban). NHTSA likewise approved combining the local and collector roads by rural/urban locale into one rural category and one urban category. All of the September 2000 weighted rates reported here use this survey design.

2.2 September 2001 Survey Design

Prior to the September 2001 survey, a thorough analysis of the current survey design was conducted. As a result, it was recommended that the number of sites be increased in selected areas. Areas identified for the increase fell into two general categories. First, the larger cities' and counties' sites were increased to better represent their population impact on the entire state survey. Secondly, road classifications that historically represent a wider range of variation for seat belt usage rates in the observational results were also increased. These modifications were submitted to NHTSA for their review and subsequent acceptance. The approved survey modifications

increased the number of sites from 79 to 113, while continuing to exclude the lowest 15 percent population counties from the survey design.

The 113 sites were clustered into logical day trips. Each cluster was then assigned a randomly generated start time and day of the week. Data were collected on all days of the week. The collection day and time used in 1998 through 2000 for existing sites were retained whenever feasible. When scheduling constraints dictated a change in time or day, the proportion of sites assigned to weekend days, morning rush, evening rush, and midday time periods were maintained. Observation sessions were evenly distributed during daylight hours (the time period between 6:30 a.m. and 6:30 p.m.). For the September 2001 survey, traffic was observed for exactly 45 minutes at each of the sites (the same observation protocol used in September 2000). Seat belt use was recorded for front-seat outboard occupants only (driver and right front passenger, if present). The formulas used to estimate usage rates, standard deviations, and relative precision for the September 2001 survey can be found in the 1998 report.

For the first time, observed commercial vehicles (minivans, large vans, pickup trucks, and light trucks) were included in the September 2001 data collection process.

Collection of in-transit motorcycle data was discontinued with the 2001 survey, thus reducing the total amount of helmet data collected. This decision was based on the inability of the observers (given the number of different observers) to accurately identify the road class.

For the first time, observed commercial vehicles were included in the September 2001 data collection process. These vehicles principally included minivans, large vans, pickup trucks, and light trucks. Semi tractor-trailers and large trucks (gross weight greater than 10,000 lbs.) continued to be excluded from the survey.

Local Community Coordinators who were trained in data collection techniques by CATS personnel collected observational data. Observational site survey forms and summary site sheets were also developed and provided to the observers by CATS.

The following counties (number of sites) were represented in the September 2001 survey.

Allen (9)	Clark (4)	Clinton (2)	DeKalb (2)
Elkhart (7)	Gibson (4)	Hamilton (6)	Hancock (5)
Hendricks (5)	Henry (3)	Howard (5)	Jackson (6)
Lake (10)	LaPorte (8)	Marion (8)	Marshall (4)
Morgan (1)	Porter (7)	Tippecanoe (6)	St. Joseph (3)
Vanderburgh (8)			

3.0 Survey Results

Survey data was collected between September 9 and September 23, 2001. Usage rates were calculated based upon the front seat outboard occupants' use of the shoulder harness. For each of the eligible occupants, a determination was made as to whether the occupant was properly wearing the

shoulder harness (yes), whether s/he was improperly restrained (shoulder harness behind his/her back) or unrestrained (no), or whether it was impossible to determine if the occupant was properly using a restraint (unknown). All children located in the front passenger seat occupying a car or booster seat were excluded from the counts, due to the inability to accurately determine their restraint status.

For the September 2001 survey, a total of 14,856 vehicles were observed, including 14,856 drivers and 3,538 eligible front seat occupants.

For the September 2001 survey, a total of 14,856 vehicles were observed, including 14,856 drivers and 3,538 eligible front seat occupants, for a total of 18,394 total occupant observations. This compares with a total of 17,153 observations in the 2000 study, representing an increase of 7.2 percent in the number of observations. However, the 2001 survey consisted of 113 sites, while there were only 79 sites in 2000, which translates to a 43.0 percent increase in the number of sites. The reduced number of collected observations per site is presumably due to the inexperience of the observers, and the emphasis on data quality rather than quantity.

Table 1 summarizes restraint usage by vehicle type:

Table 1: September 2001 Seat Belt Usage Summary
113-Sites

Vehicle Type	Percent Restrained Weighted	Percent Restrained Non-Weighted	Relative Precision	95 Percent Confidence Interval
Cars	76.0 %	75.7 %	1.8%	76.0% +/- 2.7%
Pickups	41.9 %	41.9 %	2.7%	41.9% +/- 2.2%
All Passenger Vehicles	67.4 %	67.4 %	1.4%	67.4% +/- 1.8%

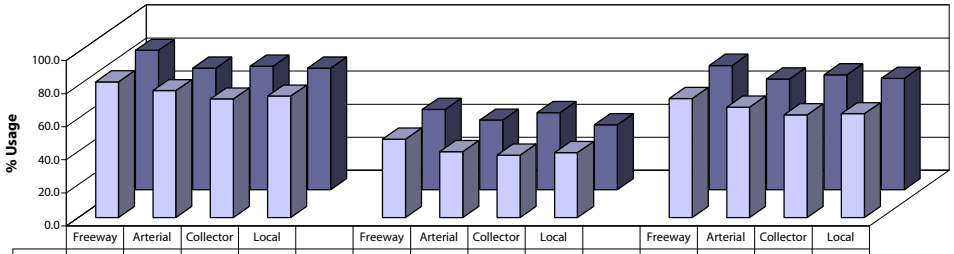
3.1 Restraint Usage by Roadway Class

Indiana roadways are classified by type of roadway. For the purposes of seat belt restraint calculations, roadways are classified as freeways (interstates), arterial, collector, and local roads. Population information also further refines the road classifications to either rural or urban areas. From the results of the September 2000 survey, the lowest percentage of restraint use was 25.0 percent for pickup truck occupants observed traveling on local/collector rural roads. The highest percentage (76.3 percent) of seat belt use observed was for occupants of passenger vehicles traveling on urban freeways. This resultant ratio of 3.04 (highest as compared to the lowest) was reduced in 2001 to 2.24. Likewise, the absolute difference in usage rates decreased from 51.3 percent in 2000 to 46.6 percent in the most recent survey. While the gap is somewhat less, the gap continues to be a large number. The 2001 survey's lowest use rates (37.7 percent) were observed on rural collector roads for occupants of pickup trucks, with the highest rates observed for occupants of passenger cars traveling on urban freeways (84.3 percent). Gains were made in all areas for both cars and pickup trucks. The greatest gains were achieved on local and collector roads in both rural and urban locales for occupants of

The greatest gains were achieved on local and collector roads in both rural and urban locales for occupants of passenger cars.

passenger cars. Unfortunately, only a minimal gain (2.1 percent) was achieved on freeways for occupants of pickup trucks. These nominal pickup truck gains indicate the limited effect of media end education programs on reaching and appealing to pickup truck occupants. Changing the primary law to include pickup trucks would probably have the greatest impact on increasing belt usage rates.

Figure 2: September 2001
Restraint Usage by Vehicle Type and Roadway Class
113-Site Survey



	Cars				Pickups				All Passenger Vehicles			
	Freeway	Arterial	Collector	Local	Freeway	Arterial	Collector	Local	Freeway	Arterial	Collector	Local
Rural	82.1	76.8	71.7	73.4	47.4	39.9	37.7	39.2	72	66.8	62.1	62.8
Urban	84.3	73.6	74.8	73.5	48.6	42.1	46.6	39.2	75.2	66.9	69.5	67.4

3.2 Restraint Usage by Vehicle Type

Minivans represented the highest overall usage rate for all occupants at 79.5 percent.

Pickup trucks and large vans in the 1998 through the 2000 surveys represented an increasing percentage of the observed vehicles (from 21.5 percent to 24.2 percent of the observed vehicles). The September 2001 survey saw that mix drop slightly to 22.4 percent of the observed vehicles. This group of vehicles represents nearly one out of four vehicles on Indiana roads, and yet, these vehicles are exempt from Indiana's primary law. Between the 2000 survey and the 2001 survey, there was an approximately 6 percent increase in restraint use among the typically higher restraint usage rate vehicles (cars, minivans, and SUVs). At the same time, an 8 percent increase was observed in the typically lower restraint usage rate vehicles (pickup trucks and large vans). The 6 percent gain in cars, minivans, and SUVs is considered to be a substantial improvement, given their already high usage rates. Minivans represented the highest overall usage rate for all occupants at 79.5 percent. While there has been much concern and discussion of seat belt usage laws relative to SUVs (the ability of occupants to claim exemption due to the vehicle being registered as a truck), this group of vehicles has an overall unweighted usage rate of 74.5 percent.

3.3 Restraint Usage by Gender and Role

Nearly two out of five male drivers continue to drive without using safety restraints.

The lowest usage rate persists among male passengers riding in pickup trucks (31.6%).

Historically, female drivers and female passengers are observed to have higher usage rates of seat belt restraint systems than their male counterparts. This pattern did not change in 2001. Overall, female drivers' use rate (unweighted) increased 10.0 percent to 79.0 percent, while the male driver usage rate (unweighted) increased 8.0 percent to 61.9 percent. Nearly two out of five male drivers continue to drive without using safety restraints. The highest usage rate (83.9 percent) was found to be female passengers of minivans, while the lowest usage rate persists among male passengers riding in pickup trucks (31.6 percent). Although this group of occupants still represents an extremely low compliance rate, for 2001, seat belt use among male passengers in pickup trucks achieved a 19.7 percent increase from the previous year's survey. For the first time, restraint usage rates for all passengers were nearly identical to the restraint usage rates for all drivers (68.8 percent versus 68.9 percent, respectively). Male front-seat passengers showed the largest gain, increasing to 56.5 percent from 43.8 percent in September 2000.

Table 2: Indiana September 2001 Unweighted Restraint Usage by Vehicle Type, Gender and Role

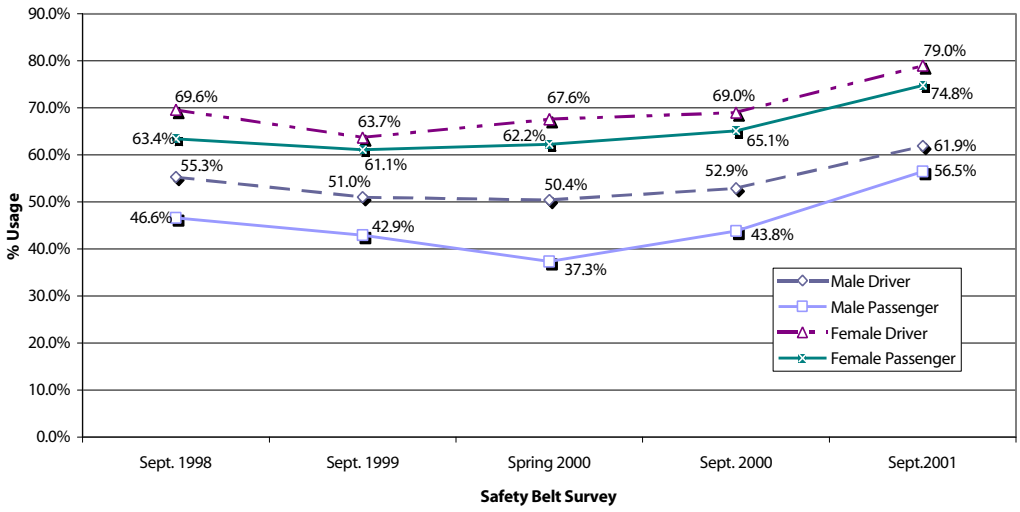
	All Drivers				Front-Seat Passengers				Eligible Occupants
Vehicle Type	R	NR	U	Percent Restrained	R	NR	U	Percent Restrained	Percent Restrained
Cars	6,201	1,922	155	76.3%	1,399	515	69	73.1%	75.7%
Pickup Trucks	1,194	1,673	112	41.6%	253	336	27	43.0%	41.9%
Minivans	1,133	295	44	79.3%	316	78	16	80.2%	79.5%
Large Vans	172	158	20	52.1%	53	28	9	65.4%	54.7%
SUV	1,267	450	60	73.8%	319	103	17	75.6%	74.1%
All Pass.	**9,967**	**4,498**	**391**	68.9%	**2,340**	**1,060**	**138**	68.8%	68.9%
	Female Drivers				**Female Front-Seat Passengers**				**Both**
Cars	3,129	779	87	80.1%	1,046	316	47	76.8%	79.2%
Pickup Trucks	182	128	3	58.7%	164	143	16	53.4%	56.1%
Minivans	661	138	21	82.7%	240	46	13	83.9%	83.0%
Large Vans	51	31	6	62.2%	37	13	5	74.0%	66.7%
SUV	649	163	23	79.9%	226	60	12	79.0%	79.7%
All Pass.	**4,672**	**1,239**	**140**	79.0%	**1,713**	**578**	**93**	74.8%	77.8%
	Male Drivers				**Male Front-Seat Passengers**				**Both**
Cars	3,072	1,143	68	72.9%	353	199	22	63.9%	71.8%
Pickup Trucks	1,012	1,545	109	39.6%	89	193	11	31.6%	38.8%
Minivans	472	157	23	75.0%	76	32	3	70.4%	74.4%
Large Vans	121	127	14	48.8%	16	15	4	51.6%	49.1%
SUV	618	287	37	68.3%	93	43	5	68.4%	68.3%
All Pass.	**5,295**	**3,259**	**251**	61.9%	**627**	**482**	**45**	56.5%	61.3%

Note: Drivers and passengers with unknown gender included in totals.

Legend: R= Restrained; NR=Not Restrained; U=Unknown Restraint; All Pass.=All non-commercial Passenger vehicles; SUV=Sport Utility Vehicles

Figure 3 shows the historical results since 1998 through the most recent survey for both gender and role (driver or passenger) of the occupant. While both genders have shown strong improvements in use rates, the male occupants continue to provide the greatest opportunity for improvement. With the approximate equal distribution between male and female occupants, each 1 percent improvement in the usage rate for males increases the overall usage rate by 0.5 percent.

Figure 3: Indiana Unweighted Restraint Usage by Gender and Role



3.4 Restraint Usage by Age of Driver and Passengers

When the young driver had no occupant, their usage rate was 61.7%, about 6% below the overall weighted average for the state.

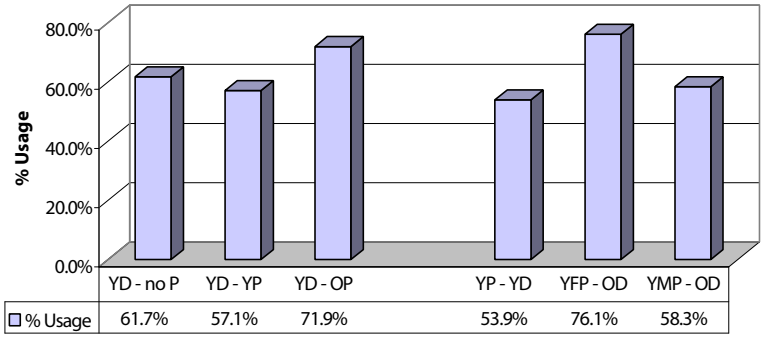
When a young passenger accompanied a young driver, the young driver's usage rate fell to 57.1 percent.

The September 2000 Indiana survey report was the first to compare seat belt use by the age of driver and the age of any front-seat, outboard passenger, if one was present. The determination that there is a young driver is a judgement decision based upon the field observer's best estimate. The cutoff age for a young driver is less than 21 years old. Figure 4 graphically displays the 2001 results. When the young driver had no occupant, their usage rate was 61.7 percent, about 6 percent below the overall weighted average for the state. However, when an older passenger (observer's estimate of 21 years old and over) accompanied a young driver, the usage rate of the young driver increased to 71.9 percent, above the overall weighted average for the state. When young passengers accompanied a young driver, the usage rates for the young passengers (53.9 percent) were in the same range as that of the young driver. When young passengers were observed riding with older drivers, seat belt use rates varied greatly depending upon the gender of the young passenger. For young female passengers riding with an older driver, those passengers had an observed usage rate of 76.1 percent, while the young male passengers had a usage rate of only 58.3 percent when being driven by an older driver. It would appear that older drivers are more tolerant or accepting of young male passengers (but not children) riding without the proper use of safety restraints.

For the young driver, seat belt use increased from 35.1 percent in 2000 to 57.1 percent in 2001.

When compared with the September 2000 results, all six of the combinations in figure 4 showed large increases for 2001. Particularly notable were the usage rates for both young passengers and young drivers when observed riding together. At that same time, the usage rate for young passengers increased from 33.1 percent in 2000 to 53.9 percent in 2001. What is particularly striking about the result is that this age group is particularly susceptible to significant peer pressure. Clearly, both young drivers and young passengers are influenced by the actions and perhaps, the influence of others in the vehicle as it relates to the proper usage of seat belts. Nonetheless, while the gains achieved this year are commendable, the usage rate for this group of occupants continues to be approximately 10 percent less than the overall state usage rate, leaving considerable room for continued focus and improvement.

Figure 4: Indiana Restraint Usage for Young Drivers and Passengers



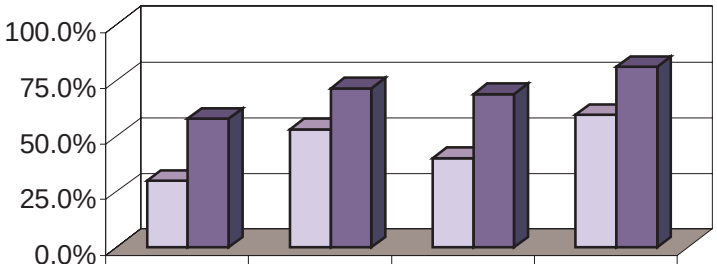
Legend

YD-no P: Young Driver - no **P**assenger
YD-YP: Young Driver - **Y**oung **P**assenger
YD-OP: Young Driver - **O**lder **P**assenger
YP-YD: Young Passenger - with **Y**oung **D**river
YFP-OD: Young Female Passenger - with **O**lder **D**river
YMP-OD: Young Male Passenger - with **O**lder **D**river

The young male driver of a pickup truck had a seat belt usage rate (29.9%) nearly half that of the same age driver observed in all other vehicles (57.8%).

The lower usage rates of the young and inexperienced drivers, coupled with the lack of a primary law on pickup trucks results in very low restraint usage rates when these drivers are observed. These usage rates have increased from half that level for young drivers operating pickup trucks (14.7 percent) versus all young drivers in other vehicles (38.0 percent) in the September 2000 survey. Figure 5 below displays the most recent September 2001 survey results comparing restraint use among pickup truck drivers and all other passenger vehicles by driver age and gender.

Figure 5: Usage Rates by Pickup Truck Drivers Compared to Drivers of All Other Vehicles

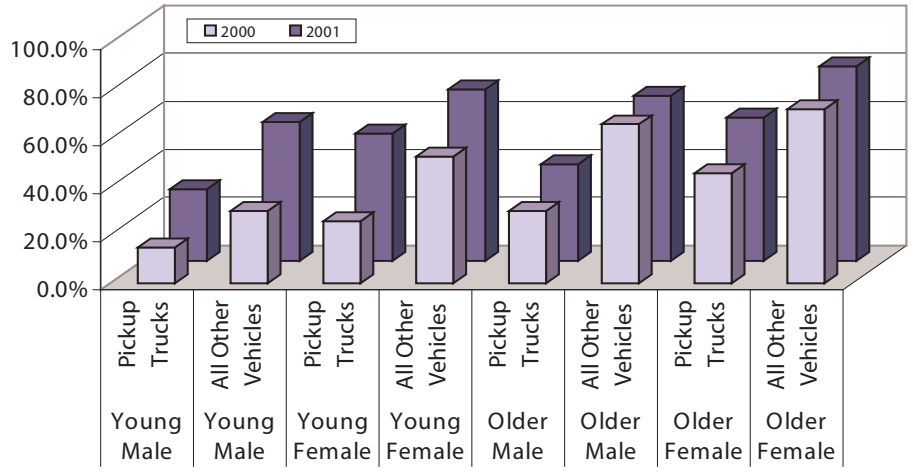


	Young	Young	Older Male	Older
Pickup Trucks	29.90%	53.10%	40.10%	59.60%
All Other Vehicles	57.80%	71.40%	68.80%	81.10%

A further comparison of the above results versus 2000 are shown in Figure 6:

Significant improvement in the use of seat belts was made among male drivers between 2000 and 2001. However, these drivers still lag behind the usage rates displayed by female drivers in both age groups and in all vehicles.

Figure 6: Usage Rates by Pickup Truck Drivers, Compared to Drivers of All Other Vehicles, 2000 versus 2001



3.5 Motorcycle Helmet Usage Rates

The overall helmet usage rate for 2001 was 32.8%.

The overall helmet usage rate for 2001 was 32.8 percent and corresponds to the 31.8 percent reported in 2000, and 37.6 percent reported in 1999. In the September 2001 survey, data was only collected during the assigned observation periods, not while in transit from one site to another. This change was made because of the difficulty in the observer accurately determining the correct road classification for those observations made on the transit roads. As a result, the total number of motorcycle observations was only 138 during this survey period.

4.0 Conclusions and Recommendations

Analysis of the September 2001 Indiana Observation Survey results showed positive improvements in all areas as defined by vehicle type, roadway type, gender, rural and urban locales, and for both driver and front seat occupants.

The experienced female driver and/or occupant, other than pickup truck occupants, have clearly heard and practice the message that seat belts save lives, as demonstrated by the seat belt usage rate of this grouping.

The opportunities to increase the usage of seat belts lie with the male occupants, particularly the inexperienced male driver, and virtually all drivers of pickup trucks.

While Indiana achieved an overall usage rate of 67.4 percent, this rate could have been increased with the following changes:

- Pickup trucks, estimated to account for nearly one out of five vehicles on Indiana's roads, with a combined male occupant usage rate of less than 40 percent, would increase the overall usage rate by an estimated:
  - 1 ½ percent with an increase in the male occupant pickup usage rate to 50 percent
  - 3 percent with an increase in the male occupant pickup usage rate to 60 percent
  - 5 percent with an increase in the male occupant pickup usage rate to 70 percent
- Young and inexperienced drivers and occupants have lower seat belt usage rates than older, more experienced drivers.

While there continues to be a gap between seat belt usage rates in rural versus urban locales, that gap has decreased. Likewise, the gap that has historically existed between local/collector roads and major roads such as arterial roads and interstates has also narrowed. This gap has now narrowed to less than a 10 percent difference. Due to their visibility and media attention, the use of enforcement zones is suspected to be a major contributor in that narrowing of that gap.

While sites are randomly selected to represent the entire state, weighted usage rates can only be accurately determined for the overall state. However,

Gibson County had the highest individual usage rate at 77.6 percent (4.7 percent of the total observations), followed by Allen and Marion counties, both reporting 74.6 percent. On the opposite end, Henry and Jackson counties, with usage rates of 52.1 percent and 53.4 percent, respectively, had the lowest usage rates.

Overall, the seat belt usage rates increased by 5.3 percent from the September 2000 survey, with passenger cars increasing by 5.9 percent (unweighted), and pickup trucks increasing by 6.3 percent (unweighted).

Emphasis within Indiana needs to continue to be on the passage of a primary law for pickup trucks. There is no valid reason to exclude pickup trucks from any seat belt requirements. (Note–the current Indiana law excludes pickup truck occupants from all seat belt usage requirements, including allowing unrestrained children (4+) to ride in the beds of pickup trucks or cargo areas of passenger vehicles, with the exception of requiring that a child under the age of four must be restrained in a pickup truck). Secondly, Indiana needs to pursue increased usage of seat belts by the younger age driving group. Without these changes, Indiana will continue to lag behind other primary law seat belt states.

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